Yaworski
4287

Five-Year Review Report

Second Five-Year Review Report
for
Yaworski Lagoon Superfund Site
Town of Canterbury
Windham County, Connecticut

September 2003

PREPARED BY:

United States Environmental Protection Agency
Region 1
Boston, Massachusetts

Approved by: Date:

for Susan Studlien, Acting Director
Office of Site Remediation & Restoration

9-30-03

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ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS

ACRONYM	DEFINITION
ACL	Alternate Concentration Limit
ARARs	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency for Toxic Substances and Disease Registry
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability
CFR	Code of Federal Regulations
CT DEP	Connecticut Department of Environmental Protection
ELUR	Connecticut Environmental Land Use Restriction
EPA	United States Environmental Protection Agency
LTRA	Long-Term Remedial Action
MCLs	Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation & Maintenance
PAH	Polycyclic Aromatic Hydrocarbons
PCOR	Preliminary Close Out Report
ppb	parts per billion
ppm	parts per million
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RSRs	Connecticut Remediation Standard Regulations
SARA	Superfund Amendments and Reauthorization Act of 1986
TAG	Technical Assistance Grant
VOCs	Volatile Organic Compounds
WasteLAN	The Regional database related to the Comprehensive Environmental Response, Compensation, and Liability Information System

EXECUTIVE SUMMARY

The remedy selected to address contamination at the Yaworski Lagoon Superfund Site, located in the Town of Canterbury, Windham County, Connecticut, as outlined in the September 29, 1988 ROD, includes:

- construction of a permanent, multi-layer cap over the lagoon, including reinforcement of the earthen dike surrounding the lagoon;
- establishing Alternate Concentration Limits (ACLs) as the groundwater protection standard for the site;
- restriction of groundwater use both within the meander bend of the river and on three properties located across the river from the site; and
- compliance monitoring of groundwater, surface water, and sediment for 30 years.

The site achieved construction completion when the Preliminary Close Out Report was signed on September 20, 2000. On September 28, 2001, EPA determined that the remedy was Operational and Functional, and documented this in an Interim RA Report.

The remedy at the Yaworski Lagoon Superfund Site currently protects human health and the environment in the short-term because: 1) ACLs have been implemented, along with a supplemental monitored natural attenuation remedy for the benzene exceedance across the river, 2) EPA performs ongoing evaluation of all results from compliance monitoring of groundwater, surface water and sediment, and 3) CT DEP continues to perform O&M on the lagoon cap. The public is protected from on-site contaminants because the fence impedes direct access to the lagoon, and control of the area around the site is generally restricted.

None of the exceedances to date have warranted further action, with the exception of recent PAH exceedances in sediment, which EPA is currently evaluating.

Institutional controls are required to prevent groundwater pumping from drawing contamination into uncontaminated areas, and to prevent exposure to contaminants in groundwater. Institutional controls have not yet been implemented on three off-site non-PRP properties, but two of three landowners have accepted offers for groundwater use restrictions and access. EPA and the State of Connecticut are working to finalize the easements required to implement these restrictions. Discussions with the third landowner are ongoing, and if the appraised value is not accepted, EPA will consider other enforcement options, including initiating a takings process.

The Yaworskis are required to implement land use and groundwater use restrictions within the meander bend of the river. EPA, the U.S. Department of Justice, and the State of Connecticut are currently working with the Yaworskis to finalize an easement pursuant to the September 2000 CD.

The Yaworskis and all three landowners are periodically notified of the need for groundwater use restrictions, and to date, they have all cooperated with the agencies in the need to restrict all use of groundwater. None of the landowners have installed wells of any kind in the groundwater use restriction zones. There are no drinking water wells immediately downgradient of the contaminated groundwater, and contamination does not migrate significantly beyond well "Ni" across the river.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name: Yaworski Lagoon Superfund Site		
EPA ID: CTD009774969		
Region: 1	**State:** CT	**City/County:** Canterbury/Windham

SITE STATUS	
NPL Status: **X** Final Deleted Other (specify)	
Remediation Status (choose all that apply)**:** Under Construction **X** Operating Complete	
Multiple OUs? Yes **X** No	**Construction completion date:** 9/20/2000
Has site been put into reuse? Yes **X** No	

REVIEW STATUS	
Lead Agency: **X** EPA State Tribe Other Federal Agency _____	
Author name: Anni Loughlin	
Author title: Remedial Project Manager	**Author affiliation:** U.S. Environmental Protection Agency
Review Period: _6_ / 30_ / _2003_ to _9_ / _23_ / _2003_	
Date(s) of inspection: _9_ / _4_ / _2003_	
Type of Review: **X** Post-SARA Pre-SARA NPL-Removal Only Non-NPL Remedial Action Site NPL State/Tribe-lead Regional Discretion	
Review number: 1 (first) **X** 2 (second) 3 (third) Other (specify) _____	
Triggering Action: Actual RA Onsite Construction at OU #_____ Actual RA Start at OU#_____ Construction Completion **X** Previous Five-Year Review Report Other (specify) Signing of ROD	
Triggering action date (from WasteLAN): _9_ / _29_ / _1998_	
Due date (five years after triggering action date): _9_ / _30_ / _2003_	

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start date and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues: ACLs should be re-evaluated every five years.

Institutional controls have not been implemented on non-PRP properties. Two of three landowners have accepted offers, but the third landowner is non-responsive.

Institutional controls not implemented on PRP property.

Further evaluation required for PAH exceedances in sediment.

Recommendations and Follow-up Actions: ACLs will be re-evaluated every five years, or earlier if necessary.

For institutional controls on properties where two non-PRP landowners have accepted offers, resolve outstanding comments regarding appraisal survey maps, finalize & record easements, and make payments to landowners. For institutional controls on property where third non-PRP landowner has not responded to the offer, investigate enforcement options and potentially initiate takings process.

Regarding institutional controls on PRP property, finalize investigations and decisions regarding title insurance requirements and access, and record easement.

Ongoing evaluation of PAHs in sediment will be supplemented with analysis of 2002 and 2003 data. Sediment sampling in 2003 will occur in October.

Protectiveness Statement: The remedy at the Yaworski Lagoon Superfund Site currently protects human health and the environment in the short-term because: 1) ACLs have been implemented, along with a supplemental monitored natural attenuation remedy for the benzene exceedance across the river, 2) EPA performs ongoing evaluation of all results from compliance monitoring of groundwater, surface water and sediment, and 3) CT DEP continues to perform O&M on the lagoon cap.
The public is protected from on-site contaminants because the fence impedes direct access to the lagoon, and control of the area around the site is generally restricted.

None of the exceedances to date have warranted further action, with the exception of recent PAH exceedances in sediment, which EPA is currently evaluating. EPA will continue to evaluate all exceedances, and determine whether exceedances are site-related and warrant corrective action.

Institutional controls are required to prevent groundwater pumping from drawing contamination into uncontaminated areas, and to prevent exposure to contaminants in groundwater. Institutional controls have not yet been implemented on three off-site non-PRP properties, but two of three landowners have accepted offers for groundwater use restrictions and access. EPA and the State of Connecticut are working to finalize the easements required to implement these restrictions. Discussions with the third landowner are ongoing, and if the appraised value is not accepted, EPA will consider other enforcement options, including initiating a takings process.

The Yaworskis are required to implement land use and groundwater use restrictions within the meander bend of the river. EPA, the U.S. Department of Justice, and the State of Connecticut are currently working with the Yaworskis to finalize an easement pursuant to the September 2000 CD.

The Yaworskis and all three landowners are periodically notified of the need for groundwater use restrictions, and to date, they have all cooperated with the agencies in the need to restrict all use of groundwater. None of the landowners have installed wells of any kind in the groundwater use restriction zones. There are no drinking water wells immediately downgradient of the

1.0 INTRODUCTION

The purpose of this five-year review is to determine whether the remedy for the Yaworski Lagoon Superfund Site is protective of human health and the environment. The methods, findings and conclusions of this review are documented in this Five-Year Review Report. In addition, this report identifies any issues found during the preparation of this five-year review along with recommendations to address such issues.

The United States Environmental Protection Agency (EPA) must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121(c), as amended, states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The agency interpreted this requirement further in the NCP; part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

EPA Region I has conducted a five-year review of the remedial actions implemented at the Yaworski Lagoon Superfund Site in the Town of Canterbury, Windham County, Connecticut. This review was conducted from June 2003 through September 2003. This report documents the results of the review.

This is the second five-year review for the Yaworski Lagoon site. The triggering action for this review is the date of the first five-year review, as shown in EPA's WasteLAN database: September 29, 1998. This review is required by statute as the Record of Decision (ROD) was signed after October 17, 1986, the effective date of the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the remedial action will leave hazardous substances, pollutants, or contaminants on site above levels that allow for unlimited use and unrestricted exposure. The Connecticut Department of Environmental Protection (CT DEP) reviewed this document.

2.0 SITE CHRONOLOGY

The chronology of the site, including all significant site events and dates is included in Table 1.

Table 1: Chronology of Site Events

Event	Date
Industrial waste disposal on site.	1950 to 1973
CT DEP orders environmental assessment of site.	1976 to 1980
Site covered with paper, rags, and rubble.	1982
Proposal to National Priorities List (NPL).	December 30, 1982
Final Listing on NPL.	September 8, 1983
Initial Remedial Investigation/Feasibility Study.	1986
Supplemental Remedial Investigation/Feasibility Study.	1987 to 1988
Record of Decision (ROD) signed.	September 29, 1988
Consent Decree (CD) entered.	February 26, 1990
Potentially Responsible Parties (PRPs) submit lagoon closure plan and ACL Demonstration Report; EPA disapproves ACL Demonstration Report and requires installation of additional monitoring wells.	May 1990
EPA approves PRP lagoon closure plan.	May 3, 1990
PRPs award contract for lagoon closure.	June 5, 1990
PRPs conduct initial groundwater sampling round for ACL Demonstration.	March 1991
PRP construction documentation report for lagoon cap and dike.	March 1991
EPA approves PRP Post-Closure Work Plan for the lagoon cap and dike.	April 8, 1991
EPA/CT DEP final inspection of lagoon cap and dike.	November 25, 1991
EPA approves PRP's final Remedial Construction Report for lagoon cap and dike.	March 31, 1992
PRPs conduct second round of groundwater monitoring for ACL development; results indicate benzene Maximum Contaminant Level (MCL) exceedance across the river in well "Ni."	October 1992
EPA confirms benzene MCL exceedance across the river; requires PRPs to implement a Corrective Action Program.	February 1993
PRPs submit revised ACL Demonstration Plan.	March 1993
PRPs begin quarterly compliance monitoring of groundwater, surface water, and sediment.	
PRPs submit Corrective Action Work Plan.	June 1993
EPA disapproves PRP Corrective Action Work Plan.	August 1993
PRPs submit revised Corrective Action Work Plan; EPA disapproves.	September 1993
PRPs submit additional revised Corrective Action Work Plan.	October 1993
Pervel Industries, Inc. (lead PRP responsible for all work under 2/26/1990 CD) notifies EPA that it is financially unable to perform any remaining work at the Site.	October 27, 1993
PRPs agree to finalize Corrective Action Work Plan; EPA submits comments.	September 1995
EPA executes a Stipulation and Order with the site owner/operators ("the Yaworskis"), under which they agree to perform certain activities, including finalizing the Corrective Action Work Plan.	October 20, 1995

Yaworskis' contractor submits significantly revised Corrective Action Work Plan.	March 1996
Two of three off-site landowners accept EPA offers for access and institutional controls.	June 1996
EPA submits comments on revised Corrective Action Work Plan.	July 1996
U.S. enters de minimis-type Consent Agreement with five low-volume generators resolving their liabilities under the 2/26/1990 CD.	July 18, 1996
Yaworskis notify EPA that they are financially unable to perform any remaining work at the site.	October 1996
U.S. files a complaint against Pervel Industries, Inc. and its parent company, the Bemis Company.	December 2, 1996
EPA assumes all responsibility to perform further response actions at the Site, with the exception of operation and maintenance (O&M) activities on the lagoon cap which are to be performed by the State of Connecticut. EPA contractor M&E begins compliance monitoring activities.	December 1996
The Connecticut Department of Environmental Protection (CT DEP) begins O&M activities for lagoon cap and dike.	March 1997
EPA finalizes Corrective Action Work Plan; M&E begins on-site field activities to investigate the nature and extent of the benzene exceedance at well "Ni."	June 1998
First five year review; EPA certifies that the remedy remains protective of human health and the environment.	September 29, 1998
EPA increases offers to three off-site landowners for access and institutional controls based on revised appraisals; two of three landowners accept.	January 1999
U.S. files a complaint against the Yaworskis.	April 7, 1999
EPA human health and ecological risk screening evaluations for surface water and sediment data.	December 1999
EPA approves the final Pre-Design Engineering Report on the benzene exceedance at well "Ni"; monitored natural attenuation is selected as the corrective action measure.	December 1999
EPA approves the Final ACL Demonstration Report, formalizing the methodology by which ACLs will be set.	December 30, 1999
U.S. enters Consent Decree with Pervel Industries, Inc. and the Bemis Company formalizing settlement resulting in a final cash-out figure of three million dollars ($3,000,000).	August 11, 2000
EPA/CT DEP final Site-wide inspection.	August 23, 2000
EPA approves 279 final ACLs for point of compliance wells.	September 18, 2000
EPA approves Preliminary Close-Out Report documenting completion of RA construction; start of one-year Operational & Functional period.	September 20, 2000
U.S. enters Consent Decree with the Yaworskis formalizing settlement resulting in a final cash-out figure of one million, four hundred and twenty-five thousand dollars ($1,425,000).	September 25, 2000
EPA approves Interim Remedial Action (RA) Report documenting that all necessary RA is complete and the start of the Long-Term Remedial Action (LTRA) phase.	September 28, 2001

3.0 BACKGROUND

Physical Characteristics.

The Yaworski Lagoon Superfund Site is located on approximately five acres of land between Route 169 and Packer Road in Town of Canterbury, Windham County, Connecticut. The site is bordered by the Quinebaug River on the north, west, and south, and by Packer Road to the east.

The lagoon is located within a meander loop on the floodplain of the Quinebaug River. The site is a dewatered and backfilled lagoon, and measures approximately 700 feet by 300 feet. Open fields that were once used for the production of silage corn are to the east and south of the lagoon. Approximately 2000 feet southeast of the lagoon is a municipal solid waste landfill. Wetland and wet areas are located along the riverbank south of the lagoon.

Groundwater flow from the site discharges to Quinebaug River, primarily to the south, downgradient of the lagoon. The nearest residents are located across the Quinebaug River, to the north, west, and south. Residential homes are also located along Packer Road to the east.

Figures provided in Attachment 1 and Attachment 2 to this report, show the general location of the site and a more detailed map of the area.

Land and Resource Use.

The lagoon was operated from 1950 to 1973, and is currently inactive. The parcel is privately owned by the Yaworski family. (No reuse is currently planned for the site, or any land use that might interfere with the remedy, due to the waste-in-place remedy and planned institutional controls prohibiting future use of groundwater.)

The abutting parcel to the east is also owned by the Yaworskis. A municipal solid waste landfill, the Packer Road (Yaworski) Landfill (EPA ID Number CTD981204431), is located on this parcel, but is not part of the Superfund Site. The landfill accepted solid waste until early 1995 at which time it stopped accepting waste. The landfill is regulated under state authority and CT DEP expects to begin construction related to closure activities in calendar year 2004. A currently unused transfer station continues to be located on this parcel.

The current land use for other surrounding areas is mainly residential. The Quinebaug River is used for recreational purposes, such as canoeing. The landfill abuts the river both upgradient and downgradient of the lagoon.

Residential homes near the site obtain their drinking water from private residential wells. Residential homes along Packer Road are not impacted by the lagoon. No residential wells located downgradient of the site have been impacted by contaminants emanating from the lagoon.

History of Contamination.

From 1950 to 1973, industrial wastes including solvents, paints, textile dyes, acids, resins, and various other debris were dumped into the lagoon. Flammable waste was periodically burned at the Site until 1965 when the Connecticut Department of Health ordered a halt to on-site burning of waste. The combined efforts of local residents, and state and local officials led to the end of all dumping at the Site in 1973.

In 1976, the Connecticut Department of Environmental Protection (CT DEP) directed the Site owner, James Yaworski, Sr., to assess the environmental hazard posed by the Site. Mr. Yaworski was required to install monitoring wells adjacent to the lagoon, which detected contaminated groundwater. In 1980, CT DEP ordered Mr. Yaworski to employ a professional engineering firm to conduct an environmental study of the property. The firm concluded that most of the contaminants had migrated from the abandoned lagoon and recommended capping the area. In response to an order by CT DEP in 1982, Mr. Yaworski covered the Site with paper, rags, rubble and soil.

Initial Response.

After a fire occurred at the Site in 1982, EPA decided that additional information was needed about the Site to better assess the potential threat to human health and the environment. EPA proposed the Site to the National Priorities List (NPL) on December 30, 1982 (47 FR 58476) and added it to the final list on September 8, 1983 (48 FR 40658).

The initial Remedial Investigation (RI), completed in April 1986, concluded that several areas needed further study before a cleanup decision could be made. A Supplemental RI and Feasibility Study were completed in 1987 and 1988. The lagoon was found to contain approximately 65,000 cubic yards of highly contaminated sludge, a mixture of water, dirt, volatile organic compounds (VOCs), semi-VOCs, and heavy metals. Organic compounds included 2-butanone, toluene, total xylenes, and bis(2-ethylhexyl)phthalate. Heavy metals included arsenic, chromium, lead and mercury. Further, the sludge was covered by an additional 60,000 cubic yards of contaminated debris, consisting of dirt, rags, trash, and construction materials, and saturated with contaminated water perched above the sludge.

On September 29, 1988, the Regional Administrator signed a Record of Decision (ROD), for which the State of Connecticut concurred. An initial Consent Decree (CD) was entered in the United States District Court, District of Connecticut on February 26, 1990.

No activities were conducted using removal authority at this site.

Basis for Taking Action.

The ROD concluded that potential threats to human health and the environment could primarily occur via physical contact with wastes, exposure to contaminated soils, sediments and groundwater, and discharge of contaminants to surface water, sediments, and the nearby wetland.

The ROD stated that dermal contact with contaminated leachate and sediments would pose an incremental lifetime cancer risk, and although contaminated groundwater was not being consumed at the time, ingestion of groundwater would result in risks that exceed EPA's cancer risks target and exceed acceptable reference doses for exposure to non-carcinogens. Concentrations of heavy metals in the wetland due to leachate flow from the lagoon and erosion of contaminated sediments also exceeded chronic and acute Ambient Water Quality Criteria and ecotoxicity criteria.

4.0 REMEDIAL ACTIONS

Remedy Selection.

Remedial action objectives for the site included the following:

- minimize exposure to contaminated groundwater;
- ensure that contamination from the lagoon does not adversely impact the Quinebaug River;
- protect environmental receptors in the wetlands;
- minimize exposure to contaminated leachate seeps; and
- attain Applicable or Relevant and Appropriate Requirements (ARARs).

As outlined in the September 29, 1988 ROD, the selected remedy for the site included:

- construction of a permanent, multi-layer cap over the lagoon, including reinforcement of the earthen dike surrounding the lagoon;
- establishing ACLs as the groundwater protection standard for the site;
- restriction of groundwater use both within the meander bend of the river and on three properties located across the river from the site; and
- compliance monitoring of groundwater, surface water, and sediment for 30 years.

An ACL establishes a numerical limit on the amount of contamination that can exist in groundwater at the point of compliance (POC) without endangering human health and the environment where receptors are potentially exposed. In the event ACLs are exceeded, or if certain other conditions are not met, the ROD provides for the development of a corrective action contingency plan, to include the installation and operation of a groundwater extraction and treatment system or other necessary action required. The other conditions that must be maintained, and restored if necessary, are outlined in the ROD and the CD as follows:

1) ACLs shall not be exceeded at the POC monitoring wells located immediately adjacent to the lagoon, well clusters “B,” “C,” and “G” (see Attachment 2).
2) At the point of exposure (the Quinebaug River), the concentration of hazardous constituents shall not pose a risk to human health and the environment.
3) The Quinebaug River shall be maintained as a hydraulic barrier to contaminated groundwater (that is, preventing contamination from crossing to the opposite side of the river). This condition is measured by ensuring Maximum Contaminant Levels (MCLs) are not exceeded across the river from the lagoon.
4) The Quinebaug River shall not be adversely impacted by the discharge of contaminants into it.

Remedy Implementation and Operation and Maintenance.

Note: due to the unusual situations that required a change from PRP-lead to Fund-lead performance of work, a section has been added to this report documenting enforcement history.

EPA approved the Potentially Responsible Parties' (PRPs) lagoon closure plan on May 3, 1990. The PRPs awarded the contract on June 5, 1990 and construction began shortly thereafter on the lagoon cap and dike. Most construction was completed by late 1990. The PRPs submitted a construction documentation report in March 1991 outlining remaining items: establish a vegetative cover, repair erosion and regrade an area on the lagoon surface, fill holes beneath the chain link fence, and fill several small depressions at the base of the gabion wall. EPA and the State conducted a final inspection on November 25, 1991, and EPA approved the final Remedial Construction Report for the lagoon cap and dike on March 31, 1992.

EPA approved the Post Closure Work Plan for the lagoon cap on April 8, 1991. Monthly inspections and ongoing maintenance were performed by PRP contractors and employees from 1992 through December of 1996. In December 1996, the site changed from PRP-lead to Fund-lead (see "Enforcement History"), and as part of that decision, it was determined that the cap portion of the remedy was essentially in the Operation and Maintenance (O&M) phase. CT DEP agreed to take over 100% of this work, and has been performing all maintenance activities since March 1997, including regular inspections of the cap and fence, mowing the site approximately twice per year or as needed, tree and brush removal, repairs to the fence and cap, and re-seeding as needed. EPA and CT DEP conducted a final site-wide inspection on August 23, 2000 and confirmed that there was no need for additional work or construction for the lagoon cap beyond these ongoing O&M activities.

The second portion of the remedy consists of establishing ACLs as the groundwater protection standard and monitoring groundwater, surface water, and sediment for 30 years. EPA disapproved the PRP's first ACL Demonstration Report submitted in May 1990. Lack of adequate groundwater characterization required the installation of additional monitoring wells in 1990 and 1991. An initial groundwater sampling round was conducted in March 1991 to determine which compounds would be included on the ACL list. During discussions with the PRPs, EPA decided that another round of groundwater data was necessary to update site conditions, and the PRPs collected another round of data in October 1992. EPA contractors provided split sampling for each round.

After multiple submittals and extensive discussions, EPA, CT DEP and the PRPs finalized the methodology by which ACLs would be set at the site for a specific set of compounds. It was determined that two years of monitoring data would be collected, and the PRPs would conduct a statistical analysis to determine the appropriate ACLs.

Data collected during October 1992, however, indicated an MCL exceedance for benzene across the river from the lagoon at monitoring well "Ni." The Consent Decree condition requiring the

Quinebaug River act as a hydraulic barrier to contaminated groundwater flow was not being met, as evidenced by the MCL exceedance across the river. EPA technical and legal staff evaluated the benzene MCL exceedance along with all other site conditions and determined that the levels did not pose an imminent threat, and did not warrant a change in the remedy outlined in the 1988 ROD. The potential exposure to the benzene exceedance exists through ingestion of groundwater only, and there are no known drinking water wells immediately downgradient of the benzene exceedance. EPA determined in February 1993 that MCLs on the other side of the River were indeed being exceeded for benzene and that the River was not being maintained as a hydraulic barrier. As a result, the PRPs began implementing a Corrective Action Program as outlined in the 1988 ROD and 1990 Consent Decree.

Soon after the PRPs began implementing a Corrective Action program, they submitted a revised ACL Demonstration Plan (March 1993), and began quarterly compliance monitoring to start collecting data to set ACLs, and to ensure protection of human health and the environment. The PRPs conducted human health and ecological risk assessments as part of the ACL determination, and these assessments generated Protective Concentration Limits ("PCL's") for surface water, sediments, and pore water. Surface water and sediment are sampled at five locations in the river, including points upgradient, adjacent, and downgradient of the site. Pore water is sampled at four well points located in the river. Exceedances of PCLs for any specific contaminant at any one location triggers an evaluation of this contaminant in the surrounding area to determine if the contaminants are site-related. (To date, although there have been individual PCL exceedances in all media, EPA evaluations determined in all cases that remedial action was not warranted.)

In early 1993, pursuant to the Corrective Action Work Plan, the PRPs submitted work plans for Pre-Design activities to confirm that the benzene exceedance was site-related, investigate the nature and extent of the exceedance, and determine what measures, if any, were necessary to prevent plume migration beyond well "Ni" and restore groundwater across the river to below MCLs. None of the PRP work plans were finalized due to numerous changes in the status of the PRPs (see "Enforcement History"). While the PRPs also updated the ACL Demonstration Report in 1995 and 1996, the report was not finalized before all PRPs defaulted from the site.

Quarterly monitoring confirmed that the benzene continued to be exceeded at well "Ni" at levels ranging from 8 parts per billion (ppb) to 23 ppb. The MCL for benzene is 5 ppb. In December of 1996, EPA and the State of Connecticut took over all work at the site, and EPA's contractor Metcalf & Eddy (M&E) took over all site-wide compliance monitoring at that time.

In 1998, M&E began working on Pre-Design activities as part of the Corrective Action Program. Field investigations, consisting largely of the collection and analysis of groundwater samples from temporary small diameter wells at 41 locations, were completed in September 1998. Additional hydraulic conductivity testing and supplementary groundwater sampling and analysis of monitoring wells were also conducted, as well as groundwater modeling. The data strongly suggests that there are two volatile organic compound plumes, one from the lagoon and the other from the Packer Road Landfill which is not part of the Superfund site. The relative proportions of

various compounds differ between the two plumes, and data also indicates that the plumes are separate and distinct in the area investigated. Although both plumes appear to have migrated beneath the river, data suggest that the extent of both plumes is currently only a short distance beyond the river. CT DEP was (and continues to be) alerted of the presence of the plume that appears to be emanating from the State-regulated Landfill. This five-year review report does not evaluate the landfill plume; the remedy for the Yaworski Lagoon Superfund site is not designed to address exceedances from other sources.

To address the benzene exceedance, the Corrective Action study evaluated several remedial alternatives, including in-situ oxygen enhancement, in-well air stripping, containment walls, pump-and-treat technologies, and monitored natural attenuation, among others, as methods to reduce benzene concentrations in groundwater to or below the MCL of 5 ppb. A preliminary evaluation of natural attenuation of the lagoon VOC plume indicated that biodegradation is most likely playing a significant role in natural attenuation processes at the site, and that current subsurface conditions are favorable to continued attenuation. The estimated time frame for benzene concentrations to decrease to the MCL at the impacted well is approximately 8 to 10 years based on current conditions.

Given the above, monitored natural attenuation was selected as the best corrective action to address the benzene exceedance. EPA determined that an engineered remedy to reduce benzene concentrations in the area of well "Ni" is unwarranted for several reasons:

- the expected decrease in contamination by natural attenuation in approximately 8 to 10 years;
- the limited migration of the plume beyond the currently impacted well;
- the absence of drinking water wells in the vicinity of the plume;
- the apparent stability of site conditions based on over 8 years of monitoring results;
- the technical difficulty of implementing alternative engineered measures for limited expected success;
- no other contaminants have been detected across the river above the MCL; and
- the planned restriction on groundwater use in the area to prevent off-site pumping from further affecting movement of the contaminants.

Installation of additional monitoring wells is not required. If there is a statistically significant increase in concentrations at well clusters across the river from the site, additional monitoring wells will be considered for installation downgradient of the affected wells. Based on all historical monitoring data, however, this is not expected to occur.

EPA, in conjunction with CT DEP, approved the final Pre-Design Engineering Report on December 30, 1999. The groundwater monitoring program was modified as of calendar year 2000 to include measurements to determine changes in the configuration of the lagoon plume, and ongoing evaluation of the effectiveness of natural attenuation. EPA issued a fact sheet in April 2000 explaining its choice of natural attenuation as the corrective action measure to address the

benzene exceedance. This is consistent with the 1988 ROD which provides for additional contingency remedies as necessary (including groundwater pump and treat) if conditions arise, however, the use of another contingency remedy beyond the ongoing natural attenuation is not expected at the site.

In 1999, EPA also conducted human health and ecological risk screening evaluations based on surface water and sediment data collected from the Quinebaug River since 1993. EPA found that contact with river water and sediments poses an insignificant health risk to humans. The screening level ecological risk assessment concludes that there are now fewer site-related contaminants that could be contributing towards any potential risk (to date, none of the levels found have warranted remedial action). The monitoring program for surface water and sediments was tailored to monitor for these specific compounds as of calendar year 2000.

On December 30, 1999, as a result of the Pre-Design work and risk screening evaluations, EPA was able to approve the Final ACL Demonstration Report, formalizing the methodology by which ACLs will be set. M&E conducted statistical analysis with data collected during the Fall 1992 monitoring round, as well as data collected since March 1993 in the first 28 quarters of compliance monitoring. An ACL was established for three POC well clusters, each having a shallow, intermediate, and deep well, for 31 different contaminants, totaling 279 individual ACLs. (See Attachment 3.) Each ACL establishes a numerical limit on the amount of contamination that can exist in groundwater at the point of compliance (POC wells adjacent to the lagoon) without endangering human health and the environment where receptors are potentially exposed. Receptors at this site can be exposed where contamination emanating from the lagoon reaches the Quinebaug River (measured by PCLs in surface water, sediment, and pore water).

The bulk of the 279 total ACLs were statistically calculated using available POC well detections. In some cases, contaminants at a particular location were not detected or detected at levels lower than the established MCL. In such cases, the ACL was set at the MCL; this is an extremely conservative measure, however, and future exceedances of these particular ACLs will require careful review to determine whether the contaminant is expected to reach the river at levels above the PCLs. In other cases, contaminants at a particular location were not detected, or detected at levels lower than the current method quantitation/detection limit. When this happened for contaminants with no established MCL, the ACL was set at five times the current method quantitation/detection limit.

Five times the current method quantitation/detection limit was selected as a reasonable buffer level above the current detection limit to minimize false positive exceedances without being excessively high (i.e., none of the ACL values calculated in this way exceed PCLs set for pore water at the river). A factor of five is generally used by EPA when assessing blank contamination during data validation (any positive sample value within five times of the concentration of a blank contaminant is considered suspect due to the potential variability of the reported results).

EPA approved the final ACLs on September 18, 2000. The groundwater monitoring program

was tailored to include ensuring that ACLs are not exceeded at these POC well locations. Additionally, all ACLs will be re-evaluated every five years.

Approval of ACLs effectively constituted the completion of Remedial Action (RA) construction at this site, and the start of a one-year Operational & Functional period. EPA approved a Preliminary Close-Out Report ("PCOR") for this site on September 20, 2000, formalizing the completion of all construction activities.

The last component of the remedy is institutional controls. Groundwater use will be prohibited within 100 feet outside of the river to the north, west and south, and production wells greater than 50 gallons per minute are prohibited within 1500 feet downgradient of the site. These restrictions affect three non-PRP landowners living across the river from the lagoon. Although monitoring wells were installed on the three properties neighboring the site, and compliance monitoring has taken place since March 1993, the landowners and PRPs did not reach a formal agreement for 30 years of access and groundwater use restrictions. EPA ultimately arranged for the U.S. Army Corps of Engineers to perform appraisals on all three properties; these appraisals were finalized in June 1996, and later revised in January 1999. To date, two of the three landowners have accepted the appraised values, and EPA received approval from Headquarters to directly pay the landowners for access and groundwater use restrictions. EPA and the State of Connecticut have worked to draft formal easements for the properties pursuant to Connecticut's Environmental Land Use Restrictions regulations, potentially requiring new survey maps of the properties; CT DEP has provided comments to EPA on the survey maps provided in the appraisal packages, and EPA will coordinate with the U.S. Army Corps of Engineers on providing the necessary response to comments and/or revisions to these maps.

Discussions with the third landowner are ongoing, and if the appraised value is not accepted, EPA will consider other enforcement options, including initiating a takings process.

Restrictions prohibiting any groundwater use are also required on the property within the meander bend of the river, as well as restriction of any use of the property that would interfere with or adversely affect or impact the protectiveness of the remedy. The site owner/operators ("the Yaworskis") had previously agreed to these restrictions pursuant to the February 26, 1990 CD. As part of the September 25, 2000 settlement with the Yaworskis, the Consent Decree requires the Yaworskis to additionally execute and record in the deed an easement granting the right to enforce the land and water use restrictions. EPA, the U.S. Department of Justice, and the State of Connecticut are currently working with the Yaworskis to finalize this easement.

Enforcement History.

EPA entered into an initial 1990 Consent Decree with 11 Settling Defendants: Pervel Industries, Inc. ("Pervel"), generator of over 90% of the waste disposed in the lagoon; three settling parties that can collectively be referred to as the Yaworskis, owner/operators of the lagoon; five small generators, who collectively disposed of less than 3% of the waste in the lagoon; and two

companies which are now bankrupt or defunct. The Consent Decree designated Pervel as responsible for performance of all work, and provided that the remaining parties would be liable for the work should Pervel become unable to perform.

Pervel's consultant, ENSR Consulting and Engineering ("ENSR"), began performing most of the requirements, including developing ACLs and all corrective action requirements. Pervel also financed construction of the lagoon cap in 1990 to 1991. The Yaworskis' consultant, Fuss & O'Neill, Inc., began performing the required compliance monitoring and related work in March 1993.

In late October 1993, after ENSR had submitted a number of draft Work Plans for Pre-Design activities related to the benzene exceedance, Pervel notified EPA that it was financially unable to perform the remaining work at the site and ENSR subsequently ceased ongoing site work. In accordance with the Consent Decree, EPA notified the remaining parties (the five small generators and the Yaworskis) that Pervel was unable to perform and that they were responsible for performing the remainder of the work at the site.

Subsequently, EPA and the five low volume generators entered into an agreement resolving their liabilities under the 1990 CD for the remaining work at the site, for payment of a sum certain. That agreement, memorialized in a de minimis-type Consent Agreement, was entered in court in July 1996, and resulted in a financial settlement of $310,903, plus interest, which was placed in a site-specific Special Account.

The Yaworskis' contractor continued to conduct quarterly compliance monitoring after Pervel ceased site work. EPA negotiated an agreement with the Yaworskis, finalized September 1995 and filed in court October 1995, in which the Yaworskis agreed to finalize the ACL Demonstration Report and calculate final ACLs, conduct Pre-Design investigations, and continue quarterly compliance monitoring until Pre-Design investigations were complete. Through a side agreement among the PRPs, ENSR submitted revisions to the ACL Demonstration Plan in 1995 and 1996. The Yaworskis' contractor developed a work plan for Pre-Design investigations in 1996, but this work plan was never finalized; in October of 1996, the Yaworskis notified EPA that they could no longer continue financing any cleanup activities at the site and all PRP site work ended.

EPA formally notified the Yaworskis and the other Settling Defendants in December 1996 of Fund takeover of all site work, except for Operations and Maintenance of the lagoon cap, which the State of Connecticut agreed to perform.

On December 2, 1996, the United States filed a complaint against Pervel and its parent company, the Bemis Company ("Bemis"). After protracted litigation, the parties entered into mediation and achieved a settlement resulting in a final cash-out figure of three million dollars ($3,000,000), to be placed in a site-specific Special Account to be used, as necessary, for future response action at or near the site. The Consent Decree formalizing this settlement was entered in court on August

11, 2000.

On April 7, 1999, the United States filed a complaint against the owners/operators of the site ("the Yaworskis"). In October 1999, the United States entered into mediation with a judge of the Connecticut Superior Court and various parties regarding (a) the U.S. lawsuit regarding the Superfund site, (b) litigation brought by the State of Connecticut relating to the Yaworski Lagoon Superfund Site and the adjacent Yaworski-owned and Connecticut-regulated Packer Road Landfill, (c) a suit brought by a citizen's group, Peoples Rights in a Clean Environment ("PRICE"), relating to the State-regulated landfill, and (d) back taxes owed to Connecticut, and other remaining obligations of the Yaworskis. The U.S., Connecticut, PRICE, the Yaworskis, and various Yaworski-related entities achieved global settlement of all suits through mediation. The United States' ability-to-pay-based settlement with the Yaworskis and Yaworski-related entities in the amount of $1,425,000 will also be placed in a site-specific Special Account to be used for future response action at or near the site. The Consent Decree formalizing this settlement was entered in court on September 25, 2000. The settlement amount received by the State of Connecticut will allow the State to take the lead on implementing clean-up of the nearby solid waste landfill.

5.0 PROGRESS SINCE LAST FIVE-YEAR REVIEW

In the first five-year review, dated September 29, 1998, EPA certified that the remedy selected for this site remains protective of human health and the environment.

The first review noted that quarterly monitoring had taken place since March 1993 without interruption, but that ACLs had not yet been set. EPA approved the final ACLs on September 18, 2000, and the groundwater monitoring program was modified to include monitoring for these compounds.

Since the approval of the ACLs, there have been ACL exceedances at various POC wells. None of the exceedances have triggered the need for Corrective Action, or have warranted further evaluation (beyond continued monitoring) to determine the nature and extent of the exceedance. (See Attachment 4 for a summary table of all ACL, MCL and PCL exceedances for all sampling rounds from 1999 through 2002.) Additionally, all ACLs will be re-evaluated every five years; the first re-evaluation will occur with data received through September 2005.

The first five-year review also noted that Pre-Design activities to investigate the benzene exceedance at well "Ni" across the river from the lagoon were ongoing, and that EPA, in conjunction with CT DEP, would make an overall decision regarding the need for future site work based on these activities and risk assessment screenings based on the last five years of monitoring data.

EPA, in conjunction with CT DEP, approved the final Pre-Design Engineering Report on December 30, 1999, which selected monitored natural attenuation as the best corrective action to address the benzene exceedance. The estimated time frame for benzene concentrations to decrease to the MCL of 5 ppb at the impacted well based on conditions at that time was approximately 8 to 10 years.

The groundwater monitoring program was modified as of calendar year 2000 to include measurements to determine changes in the configuration of the lagoon plume, and ongoing evaluation of the effectiveness of natural attenuation. At the time, benzene exceedances at well "Ni" had ranged from 8 ppb to 23 ppb. Beginning in calendar year 2000, benzene exceedances have been generally lower, ranging from 5.6 ppb to 11 ppb. The most recent data available from October 2002 indicates benzene was detected at well "Ni" at 8.4 and 8.2 ppb.

The monitoring program for surface water and sediments was also tailored in calendar year 2000 to monitor for fewer specific compounds identified in the screening level ecological risk assessment that could be contributing towards any potential risk. (EPA found that contact with river water and sediments poses an insignificant health risk to humans.) Surface water and sediment are sampled at five locations in the river, including points upgradient, adjacent, and

downgradient of the site. Exceedances of PCLs for any specific contaminant at any one location triggers an evaluation of this contaminant in the surrounding area to determine if the contaminants are site-related.

Since that time, there have been several individual PCL exceedances, most of which have not warranted further evaluation (beyond continued monitoring) to determine the nature and extent of the exceedance. More recently, EPA ecological risk staff began conducting a review of widespread polycyclic aromatic hydrocarbon (PAH) detections in sediment during the last two sediment sampling rounds. PAHs have been detected at all sampling locations, including upgradient locations, and it is unclear whether the contamination is related to the Superfund site. EPA will supplement this review with data collected during the upcoming October 2003 sediment sampling round, and coordinate with CT DEP on the final determination.

Last, there is an ongoing MCL exceedance at well "Ki" for trichloroethene. EPA added well cluster K to its compliance monitoring program in 1998 to supplement investigations for the benzene exceedance at well "Ni." Since June/July 1998, EPA has detected trichloroethene at well "Ki" in every sampling round in generally increasing concentrations up to 290 ppb (the MCL is 5 ppb). The exceedance indicates that the river is not acting as a hydraulic barrier in this location, however, the data strongly suggests that there are two volatile organic compound plumes, one from the lagoon and the other from the Packer Road Landfill which is not part of the Superfund site. The relative proportions of various compounds differ between the two plumes, and data also indicates that the plumes are separate and distinct in the area investigated. Although both plumes appear to have migrated beneath the river, data collected in 1998 suggested that the extent of both plumes was only a short distance beyond the river. CT DEP continues to be alerted of the presence of the plume that appears to be emanating from the State-regulated Landfill.

EPA continues to evaluate sampling results and overall site conditions, and reports exceedances and evaluation of these exceedances to CT DEP. MCL exceedances for additional compounds, an increase in the benzene exceedance concentrations, and/or other events at the site, may require a re-evaluation of the situation in the future. The 1988 ROD provides for additional contingency remedies as necessary (including groundwater pump and treat) if conditions arise, however, the use of another contingency remedy beyond the ongoing natural attenuation is not expected at the site.

Construction of the multi-layer cap and improvement of the dike surrounding the lagoon was approved by EPA in March 1992. As part of the decision in December 1996 to change the Site from PRP-lead to Fund-lead, it was determined that the cap portion of the remedy was in the Operation and Maintenance phase. CT DEP agreed to take over 100% of this work, and has been performing all maintenance activities. CT DEP conducts regular inspections of the lagoon cap to check the condition of the vegetative cover, surrounding dike, and the condition of fence gates, locks, and signs, and provides the inspection reports to EPA. Mowing of the cap occurs twice each year, or as needed, and CT DEP performs repairs and tree/vegetation trimming as necessary. EPA and CT DEP conducted a site inspection on September 4, 2003. Apart from ongoing

maintenance requirements, no deficiencies were observed.

In 1999, EPA arranged for the installation of settlement monuments and survey points to monitor for settlement and lateral movement. A baseline survey was conducted in April 2000, and subsequent surveys were conducted in October 2000, October 2001, and October 2002. To date, there has been no measured significant settlement or lateral movement; EPA will continue to perform an annual survey each Fall to ensure ongoing integrity of the lagoon cap.

In July 2003, EPA's contractors noticed that an area between the lagoon and the landfill had been set up as a motorbike course, apparently constructed using topsoil piles that had been stored on site since the landfill ceased operations and was covered. The contractors observed several people riding motorbikes in this area, as well as evidence that people were camping in the area and down along the river.

EPA and CT DEP consulted with the Agency for Toxic Substances and Disease Registry (ATSDR) and the Connecticut Department of Public Health. ATSDR had previously evaluated the area between the lagoon and the landfill when a cornfield was planted in the area. CT DEP sent a letter to the owner of the property, Denis Yaworski, on July 31, 2003, indicating that parties should not access any of the land areas encompassing the lagoon and landfill, including the former cornfield area. During the EPA/CT DEP site inspection on September 4, 2003, the agencies observed that the motorbike area did not appear to have been used recently, noting that the entire area was overgrown with vegetation.

The agencies will continue to monitor this issue, and will take steps to ensure that citizens are not using the site in a recreational manner without additional studies regarding exposure to potential contaminants and physical hazards.

The last component of the remedy is institutional controls. Groundwater use will be prohibited within 100 feet outside of the river to the north, west and south, and production wells greater than 50 gallons per minute are prohibited within 1500 feet downgradient of the site. These restrictions affect three non-PRP landowners living across the river from the lagoon. Although monitoring wells were installed on the three properties neighboring the site, and compliance monitoring has taken place since March 1993, the landowners and PRPs did not reach a formal agreement for 30 years of access and groundwater use restrictions. EPA ultimately arranged for the U.S. Army Corps of Engineers to perform appraisals on all three properties; these appraisals were finalized in June 1996, and later revised in January 1999. To date, two of the three landowners have accepted the appraised values, and EPA received approval from Headquarters to directly pay the landowners for access and groundwater use restrictions.

Because the original CD intended for the PRPs to make arrangements for access and use restrictions, the switch from PRP-lead to Fund-lead activity on the site has been problematic. Fund-lead implementation of this portion of the remedy by EPA and the State of Connecticut has required compliance with a Connecticut's Environmental Land Use Restrictions regulations,

involving steps that were not foreseen in the original ROD and CD. EPA and the State of Connecticut had obtain subordination agreements from banks holding mortgages on the properties in question. EPA and the State of Connecticut have worked to draft formal easements for the properties pursuant to Connecticut's Environmental Land Use Restrictions regulations, potentially requiring new survey maps of the properties. CT DEP has provided public notice on the agencies' plans to implement these easements; no comments were received.

At this time, CT DEP has provided comments to EPA on the survey maps provided in the appraisal packages. EPA will coordinate with the U.S. Army Corps of Engineers on providing the necessary response to comments and/or revisions to these maps.

Discussions with the third landowner are ongoing, complicated by the landowner's ill health and the intent of the landowner's family to pursue re-zoning of the property for higher uses. If the appraised value is not accepted, EPA will consider other enforcement options, including initiating a takings process.

With respect to land use and groundwater use restrictions within the meander bend of the river, the site owner/operators ("the Yaworskis") had previously agreed to these restrictions pursuant to the February 26, 1990 CD. As part of the September 25, 2000 settlement with the Yaworskis, the Consent Decree requires the Yaworskis to additionally execute and record in the deed an easement granting the right to enforce the land and water use restrictions. EPA, the U.S. Department of Justice, and the State of Connecticut are currently working with the Yaworskis to finalize this easement. Requirements for title insurance and the need to create an access path across two separate parcels of land are complicating this effort.

6.0 FIVE-YEAR REVIEW PROCESS

This five-year review was conducted in accordance with EPA's guidance document, "Comprehensive Five-Year Review Guidance," EPA 540-R-01-007, dated June 2001. Tasks completed as part of this five-year review include review of pertinent site-related documents, an inspection of the site, discussions with PRPs and community members, and a review of the current status of regulatory or other relevant standards.

Document Review.

Site-related documents reviewed as part of this effort are listed in Attachment 5. Additionally, this review included review of all post-closure monitoring reports and data generated since the first five-year review.

Community Involvement.

Community interest in the past was mainly limited to citizens that lived in the immediate area, most along Packer Road, and many of these citizens formed a group, Peoples Rights in a Clean Environment ("PRICE"). PRICE remained active throughout the 1990's, and the bulk of their complaints were related to impacts on local residents from the municipal solid waste landfill. PRICE was awarded an EPA Technical Assistance Grant (TAG) on two separate occasions, but the group never pursued any TAG activities or drew any of the TAG funds. In both cases, the TAG funding was eventually rescinded.

ATSDR issued an initial Public Health Assessment for the Yaworski Lagoon Superfund Site in April 1988. A site review and update was released by ATSDR in September 1993. In March 1993, as a result of citizen concerns regarding cancer incidence around the lagoon and landfill, the Connecticut Department of Public Health issued a cancer incidence study for the town of Canterbury and surrounding communities; the study concluded that there was no increase of cancer.

The citizens group PRICE also petitioned ATSDR for a comprehensive Public Health Assessment for both the Yaworski Lagoon Superfund Site and the State-regulated Packer Road (Yaworski) Landfill. In April 2000, ATSDR released a Final Petitioned Public Health Assessment for the air pathway at the landfill only. In March 2001, ATSDR released a Final Petitioned Public Health Assessment for groundwater impacts from the lagoon and the landfill. ATSDR concluded that groundwater emanating from both sites was contaminated and would pose a threat if ingested, however, the groundwater from both sites was not impacting any residential wells.

In October 1999, the United States entered into mediation with a judge of the Connecticut Superior Court and various parties regarding (a) the U.S. lawsuit regarding the Superfund site, (b) litigation brought by the State of Connecticut relating to the Yaworski Lagoon Superfund Site and the adjacent Yaworski-owned and Connecticut-regulated Packer Road Landfill, (c) a suit

brought by the citizen's group PRICE relating to the State-regulated landfill, and (d) back taxes owed to Connecticut, and other remaining obligations of the Yaworskis. The U.S., Connecticut, PRICE, the Yaworskis, and various Yaworski-related entities achieved global settlement of all suits through mediation. As part of the landfill-related settlement, many of the members of PRICE were bought out by the Yaworskis and moved away from the area. Since the settlements took place, and because the area around the site is largely rural, there has been virtually no interest in the Superfund site by local residents. The Yaworskis have resold many of the houses along Packer Road; EPA and CT DEP have received a very limited number of calls in recent years, most of which are from citizens interested in buying these properties.

The public information repository is located at the Canterbury Public Library and continues to be supplemented with key documents and maintained by library staff. EPA will issue a press release to local papers regarding the second five-year review, and the completed report for this site will be sent to the information repository.

Data Reviewed.

The PRPs monitored groundwater, surface water, and sediment on a regular basis since 1993 as part of the long-term compliance monitoring plan. With the default of all PRPs in 1996, EPA took over the compliance monitoring and its contractor continues to perform monitoring three times a year. A much larger group of constituents are analyzed annually to identify whether additional constituents should be added to the regular sampling program. As previously outlined, in calendar year 2000, the monitoring program was tailored to include monitoring for ACL exceedances, monitoring of natural attenuation of the benzene exceedance across the river, and specific compounds in sediment.

All activities undertaken by EPA's contractor were reviewed and approved by EPA quality assurance staff and found to comply with all EPA and State requirements. All Quality Assurance Project Plans utilized at the site by PRP and EPA contractors incorporate QA/QC procedures and protocol. At this time, EPA's contractor is planning to submit a revised Sampling and Analysis Plan, to include a revised Quality Assurance Project Plan, which will be reviewed by QA staff.

EPA, in conjunction with CT DEP, has evaluated all site-wide exceedances. A summary of exceedances since the last five-year review is provided in Attachment 4. Monitored natural attenuation was selected as the corrective action measure for the ongoing benzene exceedance across the river. No other exceedances have warranted further evaluation or action beyond continued monitoring, with the exception of PAH exceedances in sediment, which EPA is currently evaluating. As previously discussed, EPA will supplement this evaluation with another round of sediment sampling in October 2003.

Site Inspection.

EPA staff, EPA's contractor, and CT DEP staff performed oversight of all construction activities and design of all monitoring programs. EPA and CT DEP conducted a final inspection of the lagoon cap and dike construction on November 25, 1991, and EPA approved the final Remedial Construction Report for the lagoon cap and dike on March 31, 1992.

EPA and CT DEP conducted a final site-wide inspection on August 23, 2000 and confirmed that there was no need for additional work or construction for the lagoon cap beyond ongoing operation and maintenance activities. No punch list items remained at that time. EPA and CT DEP certified on September 24, 2001 that the remedy is operational & functional, and that no additional work was required beyond ongoing operation and maintenance activities for the lagoon cap, and ongoing site-wide compliance monitoring. This marked the beginning of the site-wide Long Term Remedial Action (LTRA) phase.

EPA and CT DEP conducted a site inspection on September 4, 2003, and found the lagoon cap, vegetative cover, surrounding dike, and the condition of fence gates, locks, and signs, to be in good condition. No deficiencies were observed. CT DEP will arrange to have the lagoon cap mowed once more before the end of the calendar year, and will provide tree/vegetation trimming as necessary.

CT DEP will continue to perform post-construction O&M activities for the lagoon cap, including regular inspections, mowing the vegetative cover, and conducting repairs as necessary. EPA and CT DEP will continue to conduct an annual survey of settlement monuments and survey points to ensure ongoing integrity of the lagoon cap.

EPA's contractor will continue to perform site-wide compliance monitoring activities throughout the LTRA period. EPA and CT DEP will evaluate all monitoring results, and make ongoing determinations of the need for remedial action for future exceedances, if any. EPA and CT DEP will also continue to evaluate the benzene exceedance across the river at well "Ni." It is expected that LTRA will be completed in September 2011, at which time CT DEP will be responsible for all O&M activities site-wide.

Groundwater use restrictions are required both on site and in certain areas off site. EPA, the U.S. Department of Justice, and the State of Connecticut are currently working with the Yaworskis to finalize an easement for the property within the meander bend of the Quinebaug River. For off-site properties, EPA is working with the State of Connecticut to draft formal easements for the properties pursuant to Connecticut's Environmental Land Use Restrictions regulations for two of the three affected landowners. Discussions with the third landowner are ongoing, and if the appraised value is not accepted, EPA will consider other enforcement options, including initiating a takings process. All three landowners are periodically notified of the need for groundwater use restrictions, and to date, they have all cooperated with the agencies in the need to restrict all use of groundwater.

7.0 TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

The remedy, as outlined in the ROD, is operating as designed. The 1988 Rod outlined the following specific objectives for the remedial response:

- minimize exposure to contaminated groundwater;
- ensure that contamination from the lagoon does not adversely impact the Quinebaug River;
- protect environmental receptors in the wetlands;
- minimize exposure to contaminated leachate seeps; and
- attain Applicable or Relevant and Appropriate Requirements (ARARs).

As required by the 1988 ROD, a permanent, multi-layer cap was constructed over the lagoon, in conjunction with reinforcement of the surrounding dike and installation of a fence around the lagoon. The lagoon cap and fencing are performing as intended and continue to be maintained and repaired as necessary. A settlement monitoring program will identify any problems caused by settlement or lateral movement. No problems with the cap have been identified that fall outside of the range of normal maintenance. The lagoon cap has minimized the ongoing discharge of contaminated groundwater to surface water and sediment, and has eliminated runoff to the wetland area and potential direct exposure to contaminated debris and groundwater.

Alternate Concentration Limits (ACLs) were established as the groundwater protection standard for the site, in conjunction with a compliance monitoring program to sample groundwater, surface water and sediment. Protective Concentration Limits (PCLs) were set in the river where receptors could be potentially exposed. Monitoring for Maximum Contaminant Levels (MCLs) continues across the river from the site to ensure that the river is maintained as a hydraulic barrier. Since this requirement has not been met, with the benzene exceedance at well "Ni," the Corrective Action Program contingency in the ROD was invoked, and after Pre-Design investigations, monitored natural attenuation was selected as the most appropriate remedy. Levels of benzene at well "Ni" appear to be decreasing as anticipated. No other exceedances have warranted further evaluation, with the exception of EPA's ongoing evaluation of PAH exceedances in sediment.

The last component of the remedy is institutional controls. Prior to Fund takeover, the PRPs were unable to negotiate agreements for groundwater restrictions with the off-site landowners. EPA/State acquisition of institutional controls is now extremely complex and time-consuming.

Groundwater use will be prohibited within 100 feet outside of the river to the north, west and south, and production wells greater than 50 gallons per minute are prohibited within 1500 feet downgradient of the site. These restrictions affect three non-PRP landowners living across the river from the lagoon. To date, two of the three landowners have accepted the appraised values,

and EPA received approval from Headquarters to directly pay the landowners for access and groundwater use restrictions. EPA and the State of Connecticut drafted formal easements for the properties pursuant to Connecticut's Environmental Land Use Restrictions regulations, potentially requiring new survey maps of the properties. CT DEP has provided comments to EPA on the survey maps provided in the appraisal packages. EPA will coordinate with the U.S. Army Corps of Engineers on providing the necessary response to comments and/or revisions to these maps. CT DEP has provided public notice on the agencies' plans to implement these easements; no comments were received.

Discussions with the third landowner are ongoing, complicated by the landowner's ill health and the intent of the landowner's family to pursue re-zoning of the property for higher uses. If the appraised value is not accepted, EPA will consider other enforcement options, including initiating a takings process.

With respect to land use and groundwater use restrictions within the meander bend of the river, the site owner/operators ("the Yaworskis") had previously agreed to these restrictions pursuant to the February 26, 1990 CD. As part of the September 25, 2000 settlement with the Yaworskis, the Consent Decree requires the Yaworskis to additionally execute and record in the deed an easement granting the right to enforce the land and water use restrictions. EPA, the U.S. Department of Justice, and the State of Connecticut are currently working with the Yaworskis to finalize this easement.

Cost of System Operation/O&M.

The 1988 ROD estimated the total cost of the remedy at $2,976,000, including total capital costs of $2,259,300 and a total O&M present worth of $716,600. The PRPs were not initially required to report on their expenditures pursuant to the 1990 CD.

During the period from February 1990 to October 1993, Pervel Industries, Inc. was the lead PRP performing the work. The CD capped oversight at $225,000 until RD/RA construction was completed, and the PRPs reached that cap with payments made in August 1992. When Pervel notified EPA in October 1993 that it was unable to continue performing work, their parent company, the Bemis Company, provided EPA with copies of invoices and checks proving that they had expended the full amount of a $4,000,000 financial guarantee. This amount included lagoon cap construction costs, and costs to develop all required work plans, including the ACL Demonstration Plan. This amount did not include the costs of quarterly monitoring and lagoon cap O&M since March 1993, which was paid for by the Yaworskis.

The Yaworskis continued to pay for quarterly monitoring and lagoon cap O&M after October 1993, until they also ceased performing/financing work in October of 1996. While the Yaworskis' exact costs during this period are unknown, their contractor had previously provided certain 1994

invoices to EPA which indicate that the lagoon cap O&M cost between $3000 - $4000 per year, and the cost of monitoring and all associated laboratory work , data validation, and reporting, totaled almost $400,000 per year.

The Site has been Fund-lead since December 1996. The total cost for the EPA contractor's performance of the Pre-Design Investigation related to the benzene exceedance is $630,493. The total budget for the EPA contractor's performance of compliance monitoring from March 1997 through the July 2001 monitoring event, as well as development of ACLs, is $2,646,233, which includes all start up contract costs (work plan development, etc.). The total cost for the EPA contractor's continued performance of compliance monitoring for the next five years, from October 2001 through July 2006, is expected to be $4,063,266. EPA's direct/indirect costs are not included in these estimates. These costs also do not include O&M of the lagoon cap, for which the State took over all responsibilities at the time the Site went Fund-lead.

While it is not possible to calculate the exact difference between actual project cost and the ROD estimate, actual costs are significantly higher. This is largely attributable to the eventual default of all PRPs, requiring a highly unusual and unplanned switch from PRP-lead to Fund-lead during Remedial Design/Remedial Action. Prior to the Fund takeover, project costs had already exceeded ROD estimates mainly due to the contentious disagreements between the agencies and the PRPs regarding the methodology by which to set ACLs, followed by the unexpected exceedance of benzene across the river and the subsequent need to implement the Corrective Action program.

Note, however, that EPA has received three separate settlement payments (as outlined in "Enforcement History") to resolve all outstanding liabilities for all remaining PRPs. Payments of $310,903 from five low-volume generators, $3,000,000 to settle U.S. v. Bemis/Pervel, and $1,425,000 to settle U.S. v. Yaworski, Inc., *et. al.*, and interest for all three payments have been placed in a Site-Specific Special Account. Interest continues to accrue, and EPA is drawing off of these funds to pay for ongoing compliance monitoring. EPA will be working with the State of Connecticut to implement a Superfund State Contract.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?

Changes in Standards. The 1988 ROD, page 41, identifies the following laws, regulations and guidance as applicable to the proposed remedial alternative. Changes in standards since the 1988 ROD do not appear to affect the protectiveness of the remedy.

● Resource Conservation and Recovery Act (RCRA), Closure Regulations and Location Regulations, Part 264. The cap was designed in accordance with applicable RCRA requirements, including design to prevent washout by a 100-year flood. EPA approved the cap in March 1992, and CT DEP continues to perform all O&M requirements.
● Connecticut Hazardous Waste Management Regulations, and Connecticut Hazardous Waste

Facility Siting Rules, promulgated pursuant to Connecticut General Statutes. The cap and dike were designed and constructed to meet these regulations and rules.

● Executive Order 11990 (Wetlands) and 11988 (Floodplains) and guidance outlined under 40 CFR Part 6, Appendix A. The cap and dike were constructed in such a manner to minimize adverse impacts to the floodplain and destruction, loss, or degradation of nearby wetlands. While there was some inherent impact to the floodplain during cap construction, the 1988 ROD noted that no practicable alternative existed.

● RCRA Groundwater Protection Standards, 40 CFR, Part 264, Subpart F. Setting ACLs as the groundwater protection standard for the site meets these regulations.

● Federal Ambient Water Quality Criteria; and Connecticut Water Quality Standards and Classifications, promulgated pursuant to Connecticut General Statutes. These state and federal standards are used to monitor the effectiveness of the remedy. In addition, at points of exposure, where groundwater discharges to surface water, risk-based Protective Concentration Limits have been established using state and federal water quality criteria to ensure that the remedy is properly functioning and that no additional action is warranted to prevent impact to human health and the environment. The lagoon cap and ACLs minimize contaminated groundwater discharge and impacts to surface water to the maximum extent practicable.

● Safe Drinking Water Act regulations establishing MCLs, and Connecticut Standards for Quality of Public Drinking Water, promulgated pursuant to Connecticut General Statutes. New ARARs promulgated since the 1988 ROD include Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs). Alternate Concentration Limits required the establishment of a groundwater protection standard for each contaminant to be set based on detections at the point of compliance that will not result in an exceedance at the points of exposure of site specific limits that are protective of human health and the environment. If ACLs are exceeded, the ROD provides for implementation of a Corrective Action contingency plan, including the potential installation and operation of a groundwater pump and treat system. Protective Concentration Limits (PCLs) at the points of exposure were set based on the more conservative of human health or ecological risk-based numbers. Across the river, MCLs are set as a measure for whether the Quinebaug River continues to be maintained as a hydraulic barrier to the flow of contaminated groundwater; MCLs are not used to measure health-based risks. There are no drinking water wells immediately downgradient of contaminated groundwater. Changes to MCLs have been incorporated into the monitoring program. All ACLs will be re-evaluated in September 2005.

● EPA Risk Reference Doses; Carcinogen Group Potency Factors; and Federal Interim Sediment Criteria Values. These ARARs were all to be considered during development of ACLs. ACLs and the associated PCLs were developed using up-to-date health-based criteria and ecological

benchmarks. PCLs and all monitoring data continue to be reviewed on an ongoing basis, with the last major human health and ecological risk screenings occurring in calendar year 2000.

● Connecticut Public Health Code, promulgated pursuant to Connecticut General Statutes. This law provided the Connecticut Department of Public Health with permit authority over potable water wells. The 1988 ROD intended for this law to allow Connecticut to apply enforceable controls to restrict groundwater within one mile of the site. It was later determined that this law did not restrict groundwater use in all of the required areas, therefore requiring easements on affected properties to implement these controls.

● Clean Water Act, Section 404, 33 USC section 1344, and 40 CFR part 230; and Connecticut Inland Wetland and Water Courses Regulations, promulgated pursuant to Connecticut General Statutes. These laws and regulations limit and/or prohibit activities that adversely affect a wetland if a practicable alternative exists. The cap and dike were designed and constructed in accordance with these regulations.

● National Ambient Air Quality Standards, promulgated pursuant to the Clean Air Act. Past construction activities were conducted to minimize future emissions from the site; no waste materials were excavated during construction. There are no activities currently being conducted that trigger requirements under the Clean Air Act.

● Worker safety regulations, 29 CFR, Part 1910, promulgated pursuant to the Occupational Safety and Health Act. All past construction activities were conducted to comply with these regulations. All ongoing activities, including compliance monitoring, require compliance with an approved Health and Safety Plan. EPA contractors are required to review this plan prior to accessing the site.

● RCRA Post-Closure Regulations, 40 CFR Part 264.117 - 264.120, and 264.310, and Part 264, Subpart F. All post-closure plans for cap maintenance, compliance monitoring, and reporting included provisions required by these regulations.

● RCRA Corrective Action Regulations, 40 CFR, part 264.100. All corrective action work plans incorporated these regulations as necessary.

● Connecticut Remediation Standard Regulations (RSRs), Regulations of Connecticut State Agencies (R.C.S.A.) Sections 22a-133k1 to 3, and Connecticut Environmental Land Use Restriction (ELUR) Regulations, R.C.S.A. Section 22a-133-q-1 adopted pursuant to Sections 22a-133k, and 22a-133q of the Connecticut General Statutes. These regulations were adopted on January 30, 1996, thus they were not ARARs at the time of the1988 ROD. The RSRs provide specific numeric cleanup criteria for a wide variety of contaminants in soil, ground water, surface water and soil vapor. In certain cases when pollutants will be left in place in soil or ground water at concentrations that exceed the RSR criteria, an environmental land use restriction (ELUR) may be put in place. An ELUR is a binding agreement between a property owner and the State that the

property owner records on the municipal land records. The purpose of an ELUR is to minimize the risk of human exposure to pollutants and hazards to the environment by preventing specific uses or activities at a property or a portion of a property. EPA is working with the State to record environmental land restrictions on the Yaworski property and for three off- site properties. These ELURs will prohibit the installation of drinking water wells on these parcels and ensure that the ground water is not used for drinking or other domestic purposes.

Changes in Exposure Pathways. With the exception of the recent motorbike activity and camping near the lagoon, which has since ceased and will continue to be monitored by the agencies, no new human health or ecological exposure pathways or receptors have been identified. There are no changes in land use or the anticipated land use on or near the site. No new contaminants or contaminant sources have been identified since the completion of the Pre-Design investigations for the benzene exceedance. EPA is currently evaluating widespread PAH exceedances in sediment throughout the river. No other exceedances have warranted further evaluation.

Changes in Toxicity and Other Contaminant Characteristics; Changes in Risk Assessment Methods.

The 1988 ROD stated that dermal contact with contaminated leachate and sediments would pose an incremental lifetime cancer risk, and although contaminated groundwater was not being consumed at the time, ingestion of groundwater would result in risks that exceed EPA's cancer risks target and exceed acceptable reference doses for exposure to non-carcinogens. Concentrations of heavy metals in the wetland due to leachate flow from the lagoon and erosion of contaminated sediments also exceeded chronic and acute Ambient Water Quality Criteria and ecotoxicity criteria.

The document review did not provide information regarding the previous cancer slope factors (CSFs) used in the RI/FS and the ROD to calculate risk, however, CSFs have generally decreased. Development of ACL and PCLs included human health and ecological risk assessments to address risks to site-specific receptors, and subsequent human health and ecological risk screenings were performed on more recent monitoring data. Further, all of the risks identified in the ROD as outlined above have been addressed at this time, and most of the exposure scenarios associated with site contaminants and remedial action objectives remain the same as those identified at the time of the ROD. While the benzene exceedance in groundwater across the river was not anticipated at the time of the ROD, there is no way for exposure to occur except through ingestion of groundwater, which does not currently occur and will be restricted.

Expected Progress Towards Meeting RAOs. The remedy is progressing as expected. One exception of the need to implement monitored natural attenuation for the benzene exceedance across the river, however, the remedy implemented for this specific exceedance is also progressing as expected.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The 1988 ROD and the 1990 CD require groundwater use restrictions on three off-site properties as previously outlined. Further, the September 2000 CD with the Yaworski entities requires land use and groundwater use restrictions within the meander bend of the Quinebaug River. These requirements will prevent groundwater pumping or extraction from drawing contaminated groundwater into uncontaminated areas. An easement on the property within the meander bend will also serve to notify potential future buyers that hazardous wastes are landfilled on site, and that post closure use must never be allowed to disturb the lagoon cap or interfere with the remedy in any way.

Initially, the ROD contemplated that Connecticut Public Health Code would prevent groundwater use off site, however, it was later determined that this law did not restrict groundwater use in all of the required areas. This requirement was then assigned to various PRPs, all of whom were unable to successfully negotiate agreements with the three off-site landowners. When the site changed from PRP-lead to Fund-lead, EPA began working with the State of Connecticut on acquisition of institutional controls, which is extremely complex and time-consuming, given that the ROD did not anticipate the agencies performing this component of the remedy.

As previously outlined, two of the three landowners have accepted the appraised values, and EPA received approval from Headquarters to directly pay the landowners for access and groundwater use restrictions. EPA and the State of Connecticut drafted formal easements for the properties pursuant to Connecticut's Environmental Land Use Restrictions regulations, potentially requiring new survey maps of the properties. CT DEP has provided comments to EPA on the survey maps provided in the appraisal packages. EPA will coordinate with the U.S. Army Corps of Engineers on providing the necessary response to comments and/or revisions to these maps. CT DEP has provided public notice on the agencies' plans to implement these easements; no comments were received.

Discussions with the third landowner are ongoing, complicated by the landowner's ill health and the intent of the landowner's family to pursue re-zoning of the property for higher uses. If the appraised value is not accepted, EPA will consider other enforcement options, including initiating a takings process.

With respect to land use and groundwater use restrictions within the meander bend of the river, the site owner/operators ("the Yaworskis") had previously agreed to these restrictions pursuant to the 1990 CD. The September 2000 CD requires the Yaworskis to additionally execute and record in the deed an easement granting the right to enforce the land and water use restrictions. EPA, the U.S. Department of Justice, and the State of Connecticut are currently working with the Yaworskis to finalize this easement.

At this time, the Yaworskis and all three landowners are periodically notified of the need for groundwater use restrictions, and to date, they have all cooperated with the agencies in the need to restrict all use of groundwater. None of the landowners have installed wells of any kind in the groundwater use restriction zones. There are no drinking water wells immediately downgradient of the contaminated groundwater, and contamination does not migrate significantly beyond well "Ni" across the river.

While the public is currently protected, the need for formal groundwater use restrictions is critical to the remedy and must be implemented in order to provide long term protection.

No other new information has come to light which would call into questions the effectiveness of the remedy. No new human or ecological receptors have been identified at this time. No evidence of damage due to natural disasters was noted during the site inspection.

Technical Assessment Summary.

The remedy, as outlined in the ROD, is operating as designed and meeting all remedial action objectives in the short term. Institutional controls to prevent groundwater migration and exposure to contaminants in groundwater must be implemented in order to provide for long term protection.

The lagoon cap is being maintained and has minimized the ongoing discharge of contaminated groundwater to surface water. EPA continues to conduct monitoring of groundwater, surface water, and sediment, including monitoring ACLs at the point of compliance, PCLs at the point of exposure, and monitored natural attenuation of the benzene exceedance across the river. EPA takes all necessary measures to evaluate all exceedances as necessary. As outlined, EPA is currently evaluating PAH exceedances in sediment.

8.0 ISSUES

Based on the activities conducted during this Five-Year Review, the issues identified in Table 2 have been noted.

Table 2: Issues

Issues	Affects Current Protectiveness	Affects Future Protectiveness
ACLs will be re-evaluated every five years.	N	Y
Institutional controls not implemented on non-PRP properties; two of three landowners have accepted offers, but third landowner is non-responsive.	N	Y
Institutional controls not implemented on PRP property.	N	Y
Further evaluation required for PAH exceedances in sediment.	N	Y

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

In response to the issues noted above, it is recommended that the actions listed in Table 3 be taken:

Table 3: Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness	
					Current	Future
ACLs to be re-evaluated every five years.	ACLs approved 9/18/00; re-evaluate ACLs after five years, or earlier if necessary.	EPA and CT DEP	N/A	3/31/2006	N	Y
Institutional controls for two non-PRP properties.	Resolve outstanding comments regarding appraisal survey maps, finalize & record easements, make payments to landowners.	EPA, CT DEP, and Army Corps of Engineers	N/A	9/30/2004	N	Y
Institutional controls for third non-PRP property if landowner won't accept offer.	Investigate enforcement options, potentially initiate takings process.	EPA, CT DEP, U.S. Dept. of Justice	N/A	9/30/2004	N	Y
Institutional controls for PRP property.	Finalize investigations and decisions regarding title insurance requirements and access; finalize and record easement.	Yaworskis	EPA, CT DEP, U.S. Dept. of Justice	9/30/2004	N	Y
Further evaluation required for PAH exceedance in sediment.	Sediment sampling October 2003, supplement evaluation with 2002 and 2003 data and take appropriate action if necessary.	EPA, in conjunction with CT DEP	N/A	Sampling 10/2003. Complete evaluation by 9/30/2004	N	Y

10.0 PROTECTIVENESS STATEMENTS

The remedy at the Yaworski Lagoon Superfund Site currently protects human health and the environment in the short-term because: 1) ACLs have been implemented, along with a supplemental monitored natural attenuation remedy for the benzene exceedance across the river, 2) EPA performs ongoing evaluation of all results from compliance monitoring of groundwater, surface water and sediment, and 3) CT DEP continues to perform O&M on the lagoon cap.

The public is protected from on-site contaminants because the fence impedes direct access to the lagoon. Control of the area around the site is generally restricted by Waste Management, Inc., the entity that conducts activities at the landfill property, which is located at the entrance to the meander bend parcel. (The lagoon is located beyond the landfill.)

None of the exceedances to date have warranted further action, with the exception of recent PAH exceedances in sediment, which EPA is currently evaluating. As previously discussed, EPA will continue to evaluate these exceedances, and make a determination based on review of additional sampling rounds as to whether the exceedances are site-related and warrant corrective action. EPA will re-evaluate ACLs every five years.

Institutional controls are required to prevent groundwater pumping from drawing contamination into uncontaminated areas, and to prevent exposure to contaminants in groundwater. Institutional controls have not yet been implemented on three off-site non-PRP properties, but two of three landowners have accepted offers for groundwater use restrictions and access. EPA and the State of Connecticut are working to finalize the easements required to implement these restrictions.

Discussions with the third landowner are ongoing, and if the appraised value is not accepted, EPA will consider other enforcement options, including initiating a takings process.

With respect to land use and groundwater use restrictions within the meander bend of the river, the Yaworskis had previously agreed to these restrictions pursuant to the 1990 CD. EPA, the U.S. Department of Justice, and the State of Connecticut are currently working with the Yaworskis to finalize an easement pursuant to the September 2000 CD.

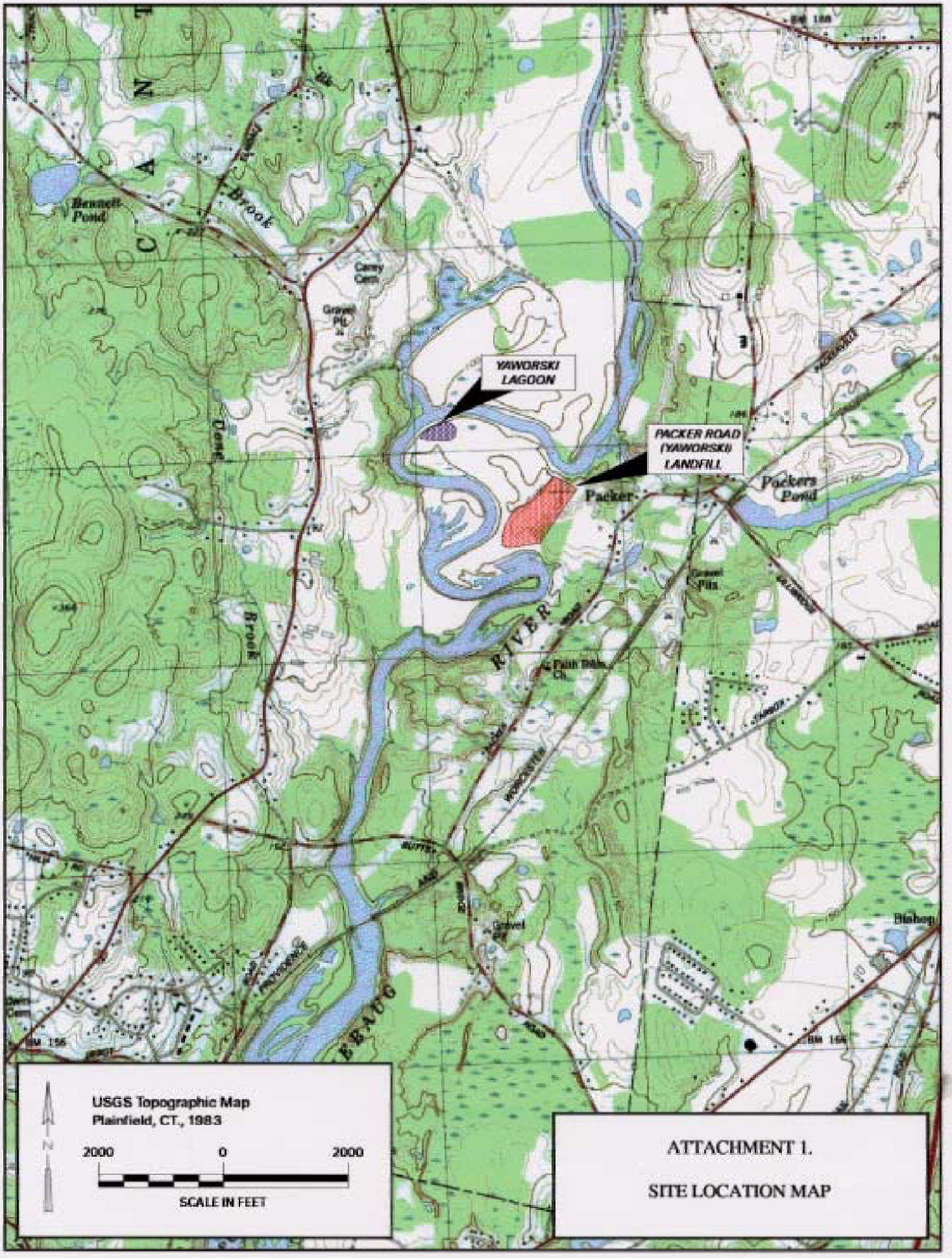
The Yaworskis and all three landowners are periodically notified of the need for groundwater use restrictions, and to date, they have all cooperated with the agencies in the need to restrict all use of groundwater. None of the landowners have installed wells of any kind in the groundwater use restriction zones. There are no drinking water wells immediately downgradient of the contaminated groundwater, and contamination does not migrate significantly beyond well “Ni” across the river.

While the public is currently protected, the need for formal groundwater use restrictions is critical to the remedy and must be implemented in order to provide long term protection.

11.0 NEXT REVIEW

The due date for this second five-year review of the Yaworski Lagoon Superfund Site is September 30, 2003. Therefore, the next five-year review should be completed by September 30, 2008.

ATTACHMENT 1
SITE LOCATION MAP



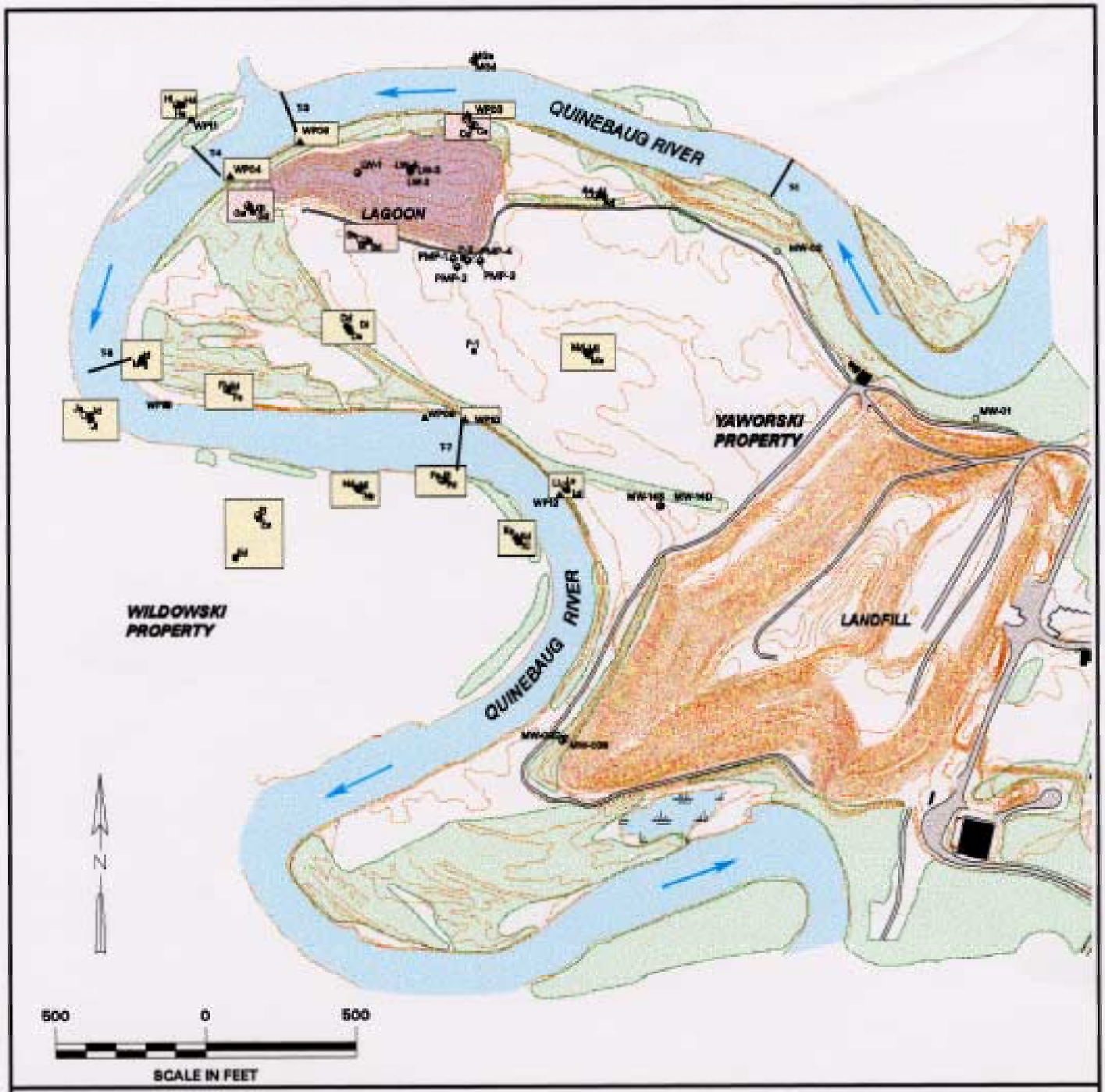
USGS Topographic Map
Plainfield, CT., 1983

ATTACHMENT 1.

SITE LOCATION MAP

/u6/yaworski/topo_2k

ATTACHMENT 2
SAMPLING LOCATIONS



LEGEND

- Monitoring Well - Shallow Flow Zone
- Monitoring Well - Intermediate Flow Zone
- Monitoring Well - Deep Flow Zone
- Piezometer
- Well Point
- Product Monitoring Point
- River Transect (Sediment)
- Sampling Locations for Compliance Monitoring Rounds (CMRs)
- Point of Compliance Wells
- Wooded Areas
- River Flow Direction

ATTACHMENT 2.
SAMPLING LOCATIONS

YAWORSKI LAGOON
SUPERFUND SITE
CANTERBURY, CONNECTICUT

ATTACHMENT 3
ALTERNATE CONCENTRATION LIMITS SUMMARY TABLE

Table 1

Alternate Concentration Limits - Summary Table

Compound/Analyte	EPA MCLs (ug/L)	Groundwater PCLs (ug/L) [1]		Established ACLs (ug/L)								
		Human Health	Ecological	Bs	Bi	Bd	Cs	Ci	Cd	Gs	Gi	Gd
1,1-dichloroethane	not available	189,000	43,100	140	50	50	99	50	50	2,050	50	50
1,4-dioxane	not available	14,000	1,000,000	500	4,900	5,500	50,000	500	500	4,600	500	500
2,4-dimethylphenol	not available	4,490	775	50	120	78	84	50	50	50	50	50
2-butanone	not available	3,060,000	169,000	97	6,400	180	180,000	50	50	7,200	65	50
4-methyl-2-pentanone	not available	51,000	46,000	250	2,400	270	9,300	50	50	1,450	50	50
benzene	5	91.20	530	50	100	290	180	50	50	50	50	50
chloroethane	not available	2,030,000	43,100	2,600	130	110	1,600	50	50	4,900	50	50
ethylbenzene	700	9,350	1,400	850	7,760	1,900	8,000	700	700	13,300	700	700
styrene	100	12,200	2,510	100	260	230	214	100	100	100	100	100
tetrahydrofuran	not available	281,000	216,000	330	31,200	75,100	99,900	250	250	21,500	1,920	250
toluene	1,000	9,350	1,270	1,300	1,000	1,000	3,400	1,000	1,000	1,250	1,000	1,000
xylene (total)	10,000	105,000	10,000	10,000	13,100	21,400	31,400	10,000	10,000	67,700	10,000	10,000
4-methylphenol	not available	21,000	200	50	90	50	120	50	50	97	50	50
bis(2-ethylhexyl)phthalate	6	120	1,800	50	50	50	50	71	50	50	50	79
naphthalene	not available	2,440	not available	50	68	50	53	50	50	50	50	50
phenol	not available	606,000	34,100	50	52	50	50	50	50	220	50	50
acetonitrile	not available	22,100	185,000	250	13,000	250	50,000	250	250	2,500	250	250
acetophenone	not available	258,000	10,300	50	69	50	50	50	50	50	50	50
N,N-dimethylformamide	not available	1,620,000	1,200,000	250	203,000	1,550,000	383,000	8,500	250	210,000	3,900	250
beta-BHC	not available	2.06	1.80	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
arsenic	50	317	not available	50	1140	226	114	50	50	220	50	50
barium	2,000	236,000	5,000	2,000	2,000	3,660	2,000	2,000	2,000	2,000	2,000	2,000
cadmium	5	5,260	not available	5	14.9	16	12.2	5	5	5	6.1	33.2
chromium	100	4,210	not available	100	100	100	100	100	100	100	100	100
cobalt	not available	7,570,000	1,000	69.3	390	379	38.1	2.5	2.5	44.9	2.5	21.5
copper	1,300	not available	not available	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
lead	15	not available	not available	15	32.5	28.5	52.2	15	15	15	15	15
mercury	2	1,260	not available	5.9	2	2	2	2	2	2	2	2
nickel	not available	842,000	not available	12.8	86.7	91.6	117	2,590	10.7	149	16.6	9.9
vanadium	not available	118,000	600	4.3	11	13.6	136	15.8	2.5	11.7	8.9	28.3
zinc	not available	1,680,000	not available	73.5	141	253	156	243	105	115	75.5	218
2,3,7,8-TCDD TE	.03 ng/L	.000264 ng/L	200 ng/L	NC	NC	NC	NC	NC	NC	NC	NC	NC

Note 1 - Groundwater PCLs were obtained from Tables 5-21 and 6-28 in ENSR's ACL Demonstration Report, March 1993 with revisions through November 1996.

NC - Not calculated due to insufficient data.

MCL - Maximum Contaminant Level

ACL - Alternate Concentration Level

METCALF & EDDY, "Final Statistical Derivation of Alternate Concentration Limits (ACLs)", July 2000

ATTACHMENT 4
EXCEEDANCES OF ACLs, PCLs, and MCLs (1999 - 2002)

GROUNDWATER ACL/MCL/PCL EXCEEDANCES FOR THE OCTOBER 1999 (27th) QMR THROUGH OCTOBER 2002 (37th) QMR

Sampling Location	Analyte	Exceedance Type	ACL/MCL/PCL (ug/L)1	Reported Concentration (ug/L)						Reported Concentration (ug/L)				
				27th QMR	28th QMR	29th CMR	30th CMR	31st CMR	32nd CMR	33rd CMR	34th CMR	35th CMR	36th CMR	37th CMR
Bd	1,4-Dioxane	ACL	5,500	NC	NC	NE	NE	NE	NE	NE	5,500 J	NE	NE	NE
Cs	1,1-Dichloroethane	ACL	99	NC	NC	NE	NE	NE	200/200*	NE	NE	NE	NE	NE
	Chloroethane	ACL	1,600	NC	NC	NE	NE	NE	1,600	NE	NE	NE	NE	NE
	Phenol	ACL	50	NC	NC	NE	NE	NE	76	NE	NE	NE	NE	NE
Gl	Tetrahydrofuran	ACL	1,920	NC	NC	2,200	2,200 J	2,300 J	NE	2,000	NE	NE	NE	NE
Hl	Aluminum2	Secondary MCL	50-200	NE	NS	NS	NE	NS	NS	145	NS	NS	NE	NS
	Iron	Secondary MCL	300	NE	NS	NS	324	NS	NS	400	NS	NS	320	NS
	Manganese	Secondary MCL	50	NE	NS	NS	470 J	NS	NS	422	NS	NS	460	NS
Hd	Manganese	Secondary MCL	50	NE	NS	NS	56.5 J	NS	NS	57.5	NS	NS	52	NS
Ks	Iron	Secondary MCL	300	454 J	NE	NE	NE	NE	631	NE	NE	NE	590	370
	Manganese	Secondary MCL	50	10,700 J	2,740 J	1,760 J	671	1,430	1,540	710	1,190	790	800	1,600
Kl	Aluminum2	Secondary MCL	50-200	NE	NE	NE	NE	NE	61.6	NE	NE	NE	NE	NE
	Iron	Secondary MCL	300	NE	NE	NE	NE	NE	NE	NE	NE	NE	330	NE
	Trichloroethene	MCL and CT MCL	5	170	180	200	260	180	220	260	250	290/260*	250	280
Kd	Iron	Secondary MCL	300	NE	NE	NE	357	NE	NE	NE	NE	NE	NE	NE
	Trichloroethene	MCL and CT MCL	5	NE	NE	NE	NE	NE	NE	6.7	NE	8.9	8.4	7
Nk	Manganese	Secondary MCL	50	340 J/347 J*	366 J	263 J	331	298	367	192	282	NE	250	300
Nl	Aluminum2	Secondary MCL	50-200	NE	NE	NE	NE	NE	57.4	NE	NE	NE	NE	NE
	Benzene	MCL and CT MCL	5	10 J/11 J*	10/11*	10/11*	9 J/8.5 J*	NE	NE	NE	5.8/5.6* J	8.1 J	7.6/7.5*	8.4/8.2* J
	Iron	Secondary MCL	300	9,720 J	11,800	12,800 J	13,800	15,800 J	4,360	4,220	9,570	4,400	17,000	14,000
	Manganese	Secondary MCL	50	1,650 J	1,860 J	1,640 J	1,750	1,920	1,370	1,140	1,570	1,900	1,700	18,000
	Thallium	MCL and CT MCL	2	NE	NE	2.2 J	NE	NE	NE	NE	NE	NE	NE	NE
Nl	bis(2-Ethylhexyl)phthalate	MCL and CT MCL	6	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	15 B
	Iron	Secondary MCL	300	586 J	796	736 J/734 J*	685/548*	600 J/821 J*	NE	NE	305	790/800*	1,200/1,200*	1,100/1,100*
	Manganese	Secondary MCL	50	302 J	400 J	323 J/325 J*	327/264*	302/406*	111/117*	252/244*	439/410*	490/500*	520/500*	530/550*
Ps	Aluminum2	Secondary MCL	50-200	NE	NE	NE	NE	132	53.8	NE	NE	NE	NE	200
	Manganese	Secondary MCL	50	660 J	1,590 J	579 J	114	1,490	369	515	363	760	200	450
Pl	Manganese	Secondary MCL	50	223 J	103 J	75.3 J	64	65.2	66.4	61.9	50	57	NE	NE
Pd	Iron	Secondary MCL	300	NE	NE	NE	NE	NE	NE	NE	NE	NE	450	NE
WP04	Lead	PCL	15	NE	NS	NE	NS	NE	NE	NS	29	NS	NS	NE
WP10	Lead	PCL	15	NE	NS	NS	NS	NE	NE	NS	98.6	NS	NS	NE

1 - Action levels and the list of evaluated compounds and analytes are from Table 8-1 of ENSR's ACL Demonstration Report (dated 3/93 with revisions per ENSR's letter to EPA, Response to Comments and Revision of the ACL Demonstration Report, dated 11/13/96). Federal Maximum Contaminant Levels (MCLs) are from U.S. EPA Office of Water's Drinking Water Standards and Health Advisories (Summer 2000). Connecticut MCLs are from Electronic Law Libraries for Connecticut Environmental, Section B102, Standards for Quality of Public Drinking Water (1998).

2 - Although the secondary MCL for aluminum is presented as a range (50- 200 ug/L), M&E has reported any exceedances above 50 ug/L.

3 - Prior to the April 2000 (29th) CMR, ACLs were not yet set for the site; therefore, the point of compliance wells were not evaluated in relation to ACLs

* - The second number is the field duplicate result

ACL - Alternate Concentration Limits

B - Found in associated method blank

J - Value is approximate due to limitations identified in the data validation review

MCL - Maximum Concentration Limits

PCL - Protective Concentration Limits

GROUNDWATER ACL/MCL/PCL EXCEEDANCES FOR THE OCTOBER 1999 (27th) QMR THROUGH OCTOBER 2002 (37th) CMR

Footnotes:

1 - Action levels and the list of evaluated compounds and analytes are from Table 8-1 of ENSR's ACL Demonstration Report (dated 3/93 with revisions per ENSR's letter to EPA, *Response to Comments and Revision of the ACL Demonstration Report, dated 11/13/96). Federal Maximum Contaminant Levels (MCLs) are from U.S. EPA Office of Water's Drinking Water Standards and Health Advisories (Summer 2000). Connecticut MCLs are from Electronic Law Libraries for Connecticut Environmental, Section B102, Standards for Quality of Public Drinking Water (1998).*

2 - Although the secondary MCL for aluminum is presented as a range (50- 200 µg/L), M&E has reported any exceedances above 50 µg/L

* - The second number is the field duplicate result

ACL - Alternate Concentration Limits

B - Found in associated method blank

J - Value is approximate due to limitations identified in the data validation review

MCL - Maximum Concentration Limits

NC - No Comparison - ACLs were not yet set for the site; therefore, the point of compliance wells were not evaluated in relation to ACLs

NE - No Exceedance

NS - Not Sampled

PCL - Protective Concentration Limits

ATTACHMENT 5
LIST OF DOCUMENTS REVIEWED

Record of Decision
Yaworski Lagoon Site, Canterbury Township, Connecticut
September 29, 1988

Consent Decree, Civil Action No.'s N-89-615(JAC) and H-89-870 (JAC)
Yaworski Lagoon Superfund Site
February 26, 1990

Construction Documentation Report, Lagoon Closure, Volumes I and II.
GZA GeoEnvironmental, Inc. (on behalf of Pervel Industries, Inc.)
March 1991.

Remedial Design/Remedial Action Work Plan, Volumes I and II
(includes Post Closure Plan and Corrective Action Plan)
ENSR Consulting and Engineering (on behalf of Pervel Industries, Inc.)
March 1991

Final Remedial Construction Report Approval, EPA
March 31, 1992

Split Sampling Report for the October, 1992 Sampling Round
Metcalf & Eddy
February 1993

Stipulation and Order
October 20, 1995

Consent Agreement to Resolve Claims for Enforcement of 1990 Consent Decree,
Civil Action No.'s N-89-615(JAC) and H-89-870 (JAC)
Yaworski Lagoon Superfund Site
July 18, 1996

Five-Year Review Report, Type 1a
September 29, 1998

Timing of Remedial Design, Remedial Action, Long-Term RA and O&M.
EPA Memo
August 12, 1999

Final Pre-Design Engineering Report
Metcalf & Eddy.
December 1999

Final Alternate Concentration Limit (ACL) Demonstration Report, Volumes I and II
ENSR Consulting and Engineering
(on behalf of Pervel Industries, Inc. and the Bemis Company).
March 1993, updated by revisions of November 1995 and November 1996, approved December 1999.

Sampling and Analysis Plan for Compliance Monitoring and
Monitored Natural Attenuation Sampling.
Metcalf & Eddy.
June 2000.

Final Statistical Derivation of Alternate Concentration Limits (ACLs)
Metcalf & Eddy.
July 2000

Consent Decree,
Civil Action No. 3:99cv626 (PCD)
U.S. v. Yaworski, Inc., *et. al.*
Yaworski Lagoon Superfund Site
August 2, 2000.

Consent Decree,
Civil Action No. 3:96-CV-2420 (AVC)
U.S. v. Bemis Company, Inc. and Pervel Industries, Inc.
Yaworski Lagoon Superfund Site
August 11, 2000.

Preliminary Close Out Report
Yaworski Lagoon Superfund Site
September 20, 2000

Interim Remedial Action Report
Yaworski Lagoon Superfund Site
September 28, 2001

Post-Closure Monitoring Reports and Exceedance Reports
for Compliance Monitoring Rounds 1999 - 2002
Metcalf & Eddy

Cap Inspection Reports
for 1998 - 2003
CT DEP